

What is claimed is:

1. A method for displaying full spectrum electronic images with increased color gamut without the use of filters, comprising:
  - 5           a) a full spectrum light source
  - b) an adjustable diffraction grating.
2. A method according to claim 1 where the adjustable grating is programmable.
- 10    3. A method according to claim 1 where the light source is a femto-second laser.
4. A method according to claim 2 where the programmable grating provides a programmable bandwidth function.
- 15    5. A method according to claim 2 where the programmable grating provides a programmable blaze angle function.
6. A method for displaying full spectrum images wherein the spectral content of the image is fully programmable.
- 20    7. A method according to claim 6 wherein the spectral content of the image is provided by a programmable grating.
8. A method according to claim 6 wherein the light source is a femto-second laser.
- 25    9. A method according to claim 6 wherein the spectral content of the image matches the color perceptual characteristics of the human visual system.
- 30    10. A method according to claim 6 wherein the programmable grating is adjustable in real time.

11. An apparatus to provide full spectrum images consisting of:

- a) a full-spectrum light source;
- b) a programmable diffraction grating;
- c) a scanning mirror;
- d) a reflection system controllable on a pixel by pixel basis

12. An apparatus according to claim 11 wherein the light source is a femto-second laser.

13. An apparatus according to claim 11 wherein the reflection system is a digital micro-mirror device.

14. An apparatus according to claim 11 wherein the scanning mirror is a multisided, front-surface mirror vibrating in synchronism with the frame rate.

15. An apparatus to provide full spectrum images incorporating a programmable grating.

16. An apparatus according to claim 17 wherein the grating is electrically deformable.

17. An apparatus according to claim 18 wherein the grating is affixed to an electrically deformable substrate.

18. An apparatus according to claim 17 wherein the grating is magnetically deformable.

19. An apparatus according to claim 20 wherein the grating is mounted to a magnetically deformable substrate.

20. An apparatus according to claim 17 wherein the grating's deformable dimensions are controlled by a computer program.